Complete Summary

GUIDELINE TITLE

Platelet transfusion for patients with cancer: clinical practice guidelines of the American Society of Clinical Oncology.

BIBLIOGRAPHIC SOURCE(S)

Schiffer CA, Anderson KC, Bennett CL, Bernstein S, Elting LS, Goldsmith M, Goldstein M, Hume H, McCullough JJ, McIntyre RE, Powell BL, Rainey JM, Rowley SD, Rebulla P, Troner MB, Wagnon AH. Platelet transfusion for patients with cancer: clinical practice guidelines of the American Society of Clinical Oncology. J Clin Oncol 2001 Mar 1;19(5):1519-38. [143 references]

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

- Thrombocytopenia
- Cancer

GUIDELINE CATEGORY

Assessment of Therapeutic Effectiveness
Management
Treatment

CLINICAL SPECIALTY

Hematology
Oncology
Pathology

INTENDED USERS

Physicians

GUIDELINE OBJECTIVE(S)

To determine the most effective, evidence-based approach to the use of platelet transfusions in patients with cancer.

TARGET POPULATION

Cancer patients with thrombocytopenia.

Note: This guideline emphasizes that not all thrombocytopenic patients require or benefit from platelet transfusion and that the decision to administer transfusion is not based solely on the platelet count but should be individualized for specific clinical settings.

INTERVENTIONS AND PRACTICES CONSIDERED

Platelet transfusion therapy, including platelet product selection (such as, platelet concentrates and single-donor apheresis platelets), prophylactic platelet transfusion, and diagnosis, prevention, and management of refractoriness to platelet transfusions.

MAJOR OUTCOMES CONSIDERED

- Prevention of morbidity and mortality from hemorrhage
- Effects on overall and disease-free survival
- Quality of life
- Toxicity reduction
- Cost-effectiveness

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The guideline developers performed literature searches using Medline (National Library of Medicine, Bethesda, Maryland) and other databases to identify pertinent articles. Keywords included "platelet transfusion," "alloimmunization," "hemorrhage," "threshold" and "thrombocytopenia." Directed searches were made of primary articles and articles from the bibliographies of selected articles.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Level and Type of Evidence

I. Evidence obtained from meta-analysis of multiple, well-designed, controlled studies. Randomized trials with low false-positive and low false-negative errors (high power).
II. Evidence obtained from at least one well-designed experimental study. Randomized trials with high false-positive and/or negative errors (low power).
III. Evidence obtained from well-designed, quasi-experimental studies such as nonrandomized, controlled single-group, pre-post, cohort, time, or matched case-control series.
IV. Evidence from well-designed, nonexperimental studies such as comparative and correlational descriptive and case studies.
V. Evidence from case reports and clinical examples.

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not applicable

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Consensus Development Based on Evidence

The entire Panel met twice. The first meeting was intended to identify topics to be addressed by the guidelines, to develop a strategy for completion of the guidelines, and to do a preliminary review of the initial literature search; the second meeting was intended to review the developed guidelines and to evaluate more critically the recommendations and supporting evidence. The guidelines were circulated in draft form, and all members of the Panel had an opportunity to comment on the levels of evidence as well as the systematic grading of the data supporting each recommendation. Final text editing was performed by Drs Schiffer and Anderson.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Grade of Recommendation

A. There is evidence of type I or consistent findings from multiple studies of types II, III, or IV.
B. There is evidence of types II, III, or IV, and findings are generally consistent.
C. There is evidence of types II, III, or IV, but findings are inconsistent.
D. There is little or no systematic empirical evidence.

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The guidelines were reviewed by five outside reviewers, the American Society of Clinical Oncology Health Services Research Committee, and the American Society of Clinical Oncology Board.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Note: Levels of evidence (I-V) and grades of evidence (A-D, NG) for recommendations are defined at the end of the Major Recommendation field.

1. Platelet Products

   Guideline: Platelets for transfusion can be prepared either by separation of units of platelet concentrates (PCs) from whole blood, which are pooled before administration, or by apheresis from single donors. Comparative studies have shown that the post-transfusion increments, hemostatic benefit, and side effects are similar with either product. Thus, in routine circumstances, they can be used interchangeably. In most centers, pooled platelet concentrates are less costly. Single-donor platelets from selected donors are preferred when histocompatible platelet transfusions are needed. Both preparations can be stored for up to 5 days after collection at 20 degrees C to 24 degrees C with good maintenance of platelet viability.
   Level of Evidence: I
   Grade of Recommendation: A

2. Prophylactic Versus Therapeutic Platelet Transfusion

Guideline: The Panel recommends that prophylactic platelet transfusion be administered to patients with thrombocytopenia resulting from impaired bone marrow function to reduce the risk of hemorrhage when the platelet count falls below a predefined threshold level. This threshold level for transfusion varies according to the patient's diagnosis, clinical condition, and treatment modality.
Level of Evidence: IV and expert consensus
Grade of Recommendation: B

3. Platelet Count Threshold for Prophylactic Platelet Transfusion: Acute Leukemia

Guideline: The Panel recommends a threshold of 10,000/microliter for prophylactic platelet transfusion in adult patients receiving therapy for acute leukemia, on the basis of the results of multiple randomized trials that demonstrate that this approach is equivalent to the use of a 20,000/microliter threshold. Transfusion at higher levels may be necessary in newborns or in patients with signs of hemorrhage, high fever, hyperleukocytosis, rapid fall of platelet count, or coagulation abnormalities (for example, acute promyelocytic leukemia) and in those undergoing invasive procedures or in circumstances in which platelet transfusions may not be readily available in case of emergencies. The studies that form the basis of this recommendation (as well as the other recommendations in this section) have included adolescents but not younger children or infants. Nevertheless, it is probably reasonable to use similar guidelines for children and older infants. Although modern automated cell counters are quite accurate at low platelet counts, there can be modest variations in count because of limitations of the counting technology. The decision to transfuse at a precise trigger level should therefore consider the clinical context and the pattern of recent platelet counts.
Level of Evidence: I
Grade of Recommendation: A

4. Hematopoietic Cell Transplantation

Guideline: Fewer studies have been performed in recipients of high-dose therapy with stem-cell support. Although such patients may experience more mucosal injury than patients receiving conventional antileukemic chemotherapy, clinical experience and the available data suggest that guidelines for prophylactic transfusion similar to those for patients with acute leukemia can be used in transplant recipients, with similar caveats about transfusion at higher counts in patients with complicating clinical conditions. The recent increased use of peripheral-blood stem cells with shorter durations of thrombocytopenia should further decrease the hemorrhagic risk.
Level of Evidence: III
Grade of Recommendation: B

5. Patients With Chronic, Stable, Severe Thrombocytopenia

Guideline: No randomized studies have been performed in patients with sustained, severe thrombocytopenia such as can be seen in individuals with myelodysplasia and aplastic anemia. Many such patients have minimal or no significant bleeding for long periods of time despite low platelet counts. On

the basis of clinical experience and limited retrospective studies, the Panel suggests that many of these patients can be observed without prophylactic transfusion, reserving platelet transfusions for episodes of hemorrhage or during times of active treatment.
Level of Evidence: IV
Grade of Recommendation: C

6. Prophylactic Platelet Transfusion in Patients With Solid Tumors

Guideline: The risk of bleeding in patients with solid tumors during chemotherapy-induced thrombocytopenia is related to the depth of the platelet nadir, although other factors contribute as well. Evidence obtained from observational studies supports the clinical benefit of prophylactic transfusion at a threshold of 10,000/microliter platelets or less. The Panel suggests, however, on the basis of expert clinical opinion, that prophylactic transfusion at a threshold of 20,000/microliter be considered for patients receiving aggressive therapy for bladder tumors as well as those with demonstrated necrotic tumors, owing to their presumed increased risk of bleeding at these sites.
Level of Evidence: IV
Grade of Recommendation: B

7. Surgical or Invasive Procedures in Thrombocytopenic Patients

Guideline: Thrombocytopenic patients frequently require invasive diagnostic or therapeutic procedures. Common procedures include placement of permanent or temporary central venous catheters, transbronchial and esophageal endoscopic biopsies, paranasal sinus aspirations, bone marrow biopsies, and occasionally even major surgery. The Panel suggests, on the basis of accumulated clinical experience, as attested to by a variety of consensus conference statements (National Institutes of Health Consensus Conference, 1987; Norfolk et al., 1998) that a platelet count of 40,000/microliter to 50,000/microliter is sufficient to perform major invasive procedures with safety, in the absence of associated coagulation abnormalities. Certain procedures, such as bone marrow aspirations and biopsies, clearly can be performed safely at counts of less than 20,000/microliter. There are sparse data about the safety of other invasive procedures at much lower count levels. If platelet transfusions are administered before a procedure, it is critical that a post-transfusion platelet count be obtained to prove that the desired platelet count level has been reached. Platelet transfusions should also be available on short notice, in case intraoperative or postoperative bleeding occurs. For alloimmunized patients, histocompatible platelets must be available in these circumstances.
Level of Evidence: IV
Grade or Recommendation: C

8. Prevention of Alloimmunization to RhD Antigens

Guideline: Prevention of RhD alloimmunization resulting from red blood cells (RBCs) contaminating platelet transfusions, either through the exclusive use of platelets from RhD negative donors or via anti-D immunoprophylaxis, should be considered for RhD-negative children (particularly girls) and for

women of child-bearing age.
Level of Evidence: IV
Grade of Recommendation: D

9. Prevention of Alloimmunization Using Leukoreduced Blood Products

Guideline: The incidence of alloantibody-mediated refractoriness to platelet transfusion can be decreased in patients with acute myeloid leukemia (AML) receiving induction chemotherapy when both platelet and red blood cell (RBC) products are leukoreduced by filtration before transfusion (level I evidence). It is therefore appropriate to provide leukoreduced blood products to patients with acute myeloid leukemia from the time of diagnosis to ameliorate this important clinical problem. Although randomized trials have not been conducted in other patient groups, it is likely that alloimmunization can also be decreased in patients with other types of leukemia and in other cancer patients receiving chemotherapy. There are no data in patients who are not receiving chemotherapy in the same time periods that the transfusions are being administered (for example, aplastic anemia, myelodysplasia), although the consensus of opinion would favor its use in these patients as well. Because leukoreduction adds appreciably to the costs of transfusion, it should be used only for patients expected to require multiple platelet transfusions during their treatment courses and is not indicated for patients with cancer receiving red blood cells or therapies that do not produce significant and sustained thrombocytopenia. In some countries, all blood products are now leukoreduced at the time of blood collection and component preparation. Should such prestorage leukoreduction become a routine in the United States, it would alleviate the need for additional filtration at the time of transfusion.
Level of Evidence: I
Grade of Recommendation: A

10. Diagnosis of Refractoriness to Platelet Transfusion

Guideline: Although there are no empirical data to suggest that monitoring and acting on the postplatelet transfusion count decreases the incidence of hemorrhagic events, the Panel consensus is that post-transfusion platelet counts should be obtained after all transfusions, whenever possible. The Panel further recommends that additional transfusions be administered if the post-transfusion count is less than the platelet trigger appropriate for that clinical situation. Because patients may have a poor increment to a single transfusion yet have excellent platelet increments with subsequent transfusions, a diagnosis of refractoriness to platelet transfusion should only be made when at least two ABO-compatible transfusions, stored less than 72 hours, result in poor increments, as defined in the supporting text of the recommendation.
Level of Evidence: V
Grade of Recommendation: D, panel consensus

11. Management of Refractoriness to Platelet Transfusion

Guideline: Patients with alloimmune refractory thrombocytopenia, as defined above, are best managed with platelet transfusions from donors who are human leukocyte antigen-A and human leukocyte antigen-B antigen selected. Most blood centers have access to computerized lists of such donors. For

patients (a) whose human leukocyte antigen type cannot be determined, (b) who have uncommon human leukocyte antigen types for which suitable donors cannot be identified, or (c) who do not respond to human leukocyte antigen-matched platelets, histocompatible platelet donors can often be identified using platelet cross-matching techniques. In many patients, these two techniques are complementary. There is no evidence that alloimmunized patients benefit from nonmatched prophylactic platelet transfusions that do not produce post-transfusion increments, and the Panel recommends that such patients be transfused only for hemorrhagic events.
Level of Evidence: III
Grade of Recommendation: B, panel consensus

Definitions:

Level and Type of Evidence

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V. Evidence from case reports and clinical examples.

Grade of Recommendation

A. There is evidence of type I or consistent findings from multiple studies of types II, III, or IV.
B. There is evidence of types II, III, or IV, and findings are generally consistent.
C. There is evidence of types II, III, or IV, but findings are inconsistent.
D. There is little or no systematic empirical evidence.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (See Major Recommendations).

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Decreased morbidity associated with intensive therapies producing severe and sustained thrombocytopenia.
- Decreased deaths from hemorrhage.

Subgroups Most Likely to Benefit:

- Patients with hematologic and solid tumor malignancies undergoing aggressive treatment.
- Patients with solid tumor malignancies and poor performance status or physiologic reserve as well as those with limited access to health care facilities during thrombocytopenia that is expected to be profound and prolonged.

POTENTIAL HARMS

- Febrile or allergic transfusion reactions
- Transmission of bacterial and viral infections
- Circulatory congestion
- Transfusion-related acute lung injury
- Alloimmunization

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

It is important to realize that these guidelines cannot always account for individual variation among patients. They are not intended to supplant physician judgment with respect to particular patients or special clinical situations and cannot be considered exclusive of other treatments reasonably directed at obtaining the same result Accordingly, the American Society of Clinical Oncology (ASCO) considers adherence to these guidelines to be voluntary, with the ultimate determination regarding its application to be made by the physician in light of each patient's individual circumstances. In addition, these guidelines describe administration of therapies in clinical practice; they cannot be assumed to apply to interventions performed in the context of clinical trials, given that clinical studies are designed to test innovative and novel therapies in a disease for which better therapy is needed. In these guidelines, development involves a review and synthesis of the latest literature; a practice guideline also serves to identify important questions for further research and those settings in which investigational therapy should be considered.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Living with Illness
Staying Healthy

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Schiffer CA, Anderson KC, Bennett CL, Bernstein S, Elting LS, Goldsmith M, Goldstein M, Hume H, McCullough JJ, McIntyre RE, Powell BL, Rainey JM, Rowley SD, Rebulla P, Troner MB, Wagnon AH. Platelet transfusion for patients with cancer: clinical practice guidelines of the American Society of Clinical Oncology. J Clin Oncol 2001 Mar 1;19(5):1519-38. [143 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2000 Nov 3

GUIDELINE DEVELOPER(S)

American Society of Clinical Oncology - Medical Specialty Society

SOURCE(S) OF FUNDING

American Society of Clinical Oncology

GUIDELINE COMMITTEE

American Society of Clinical Oncology (ASCO) Platelet Transfusion Expert Panel

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

The Panel was composed of experts in clinical medicine, clinical research, health services research, and related disciplines. The clinical experts represented all relevant medical disciplines, including medical oncology, transfusion medicine, and hematologic malignancies. Both academic and community practitioners were included. A steering committee under the auspices of the American Society of

Clinical Oncology (ASCO) Health Services Research Committee chose Panel participants for the clinical practice guideline development process.

Panel Members: Charles A. Schiffer, MD, Co-Chair; Kenneth C. Anderson, MD, Co-Chair; Charles L. Bennett, MD, PhD; Steven Bernstein, MD; Linda S. Elting, PhD; Miriam Goldsmith; Michael Goldstein, MD; Heather Hume, MD, FRCPC; Jeffrey J. McCullough, MD; Rosemary E. McIntyre, MD; Bayard L. Powell, MD; John M. Rainey, MD; Paolo Rebulla, MD; Scott D. Rowley, MD; Michael B. Troner, MD; Alton H. Wagnon, MD

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

All members of the Expert Panel complied with American Society of Clinical Oncology (ASCO) policy on conflict of interest, which requires disclosure of any financial or other interest that might be construed as constituting an actual, potential, or apparent conflict. Members of the Expert Panel completed ASCO's disclosure form and were asked to reveal ties to companies developing products that might potentially be affected by promulgation of the guidelines. Information was requested regarding employment, consultancies, stock ownership, honoraria, research funding, expert testimony, and membership on company advisory committees. The Panel made decisions on a case-by-case basis as to whether an individual's role should be limited as a result of a conflict. No limiting conflicts of interest were identified as a result of this disclosure procedure.

GUIDELINE STATUS

This is the current release of the guideline.

An update is not in progress at this time.

GUIDELINE AVAILABILITY

Electronic copies: Available from the American Society of Clinical Oncology (ASCO) Web site.

Print copies: Available from American Society of Clinical Oncology, Health Services Research, 1900 Duke Street, Suite 200, Alexandria, VA 22314.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on May 25, 2001. It was verified by the guideline developer as of September 7, 2001.

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Date Modified: 11/8/2004